



FPIinnovations
Ben Romanchych Consulting
October 2020

**Mass
Timber
Outlook**

Background

The following slides present an analysis of the incremental softwood lumber opportunity in the United States. The analysis looks at the current state of construction of residential and non-residential buildings then poses “what if” scenarios based on targeted market share gains for wood construction.

This analysis is an update from work completed in 2016. It reflects 2019 market shares, a revised perspective on how wood buildings will be constructed, and revised target market shares and is now time based.



Mass Timber Outlook

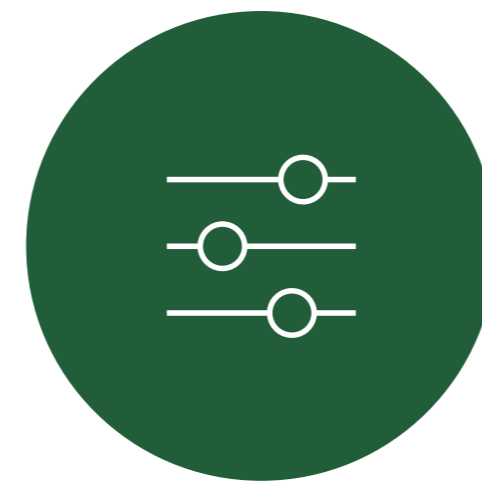
Levers of Control



HISTORICAL FLOOR AREA



HOUSING STARTS & SPENDING



WOOD SHARE %
&
HEIGHT CLASS %



BUILDING SYSTEMS (VOLUME / FT²)



WOOD VOLUME ESTIMATE

The Impact of Different Building Systems

Base Case Assumptions



LF Multifamily
Low
8 - 9 bf/sq.ft.



Steel Frame + MT Floors
Hybrid
9 - 15 bf/sq.ft.



Post & Panel
Medium
13 - 20 bf/sq.ft.



Post & Beam
Medium-High
17 - 25 bf/sq.ft.



All CLT
High
30 - 45+ bf/sq.ft.

Outlook assumes 25% of buildings are built with low wood use factors, 50% with medium wood use factors, 10% with a high wood use factor, and 15% with a steel/wood wood use factor.

Construction System	Low	Medium	High	Hybrid
Lower Stories	Light-frame	Post & Panel	Post & Beam	3 layer CLT
Higher Stories	Post & Plate	Post & Beam	All CLT	5 layer CLT

Incremental Softwood Lumber Consumption (Board Feet)

Summary

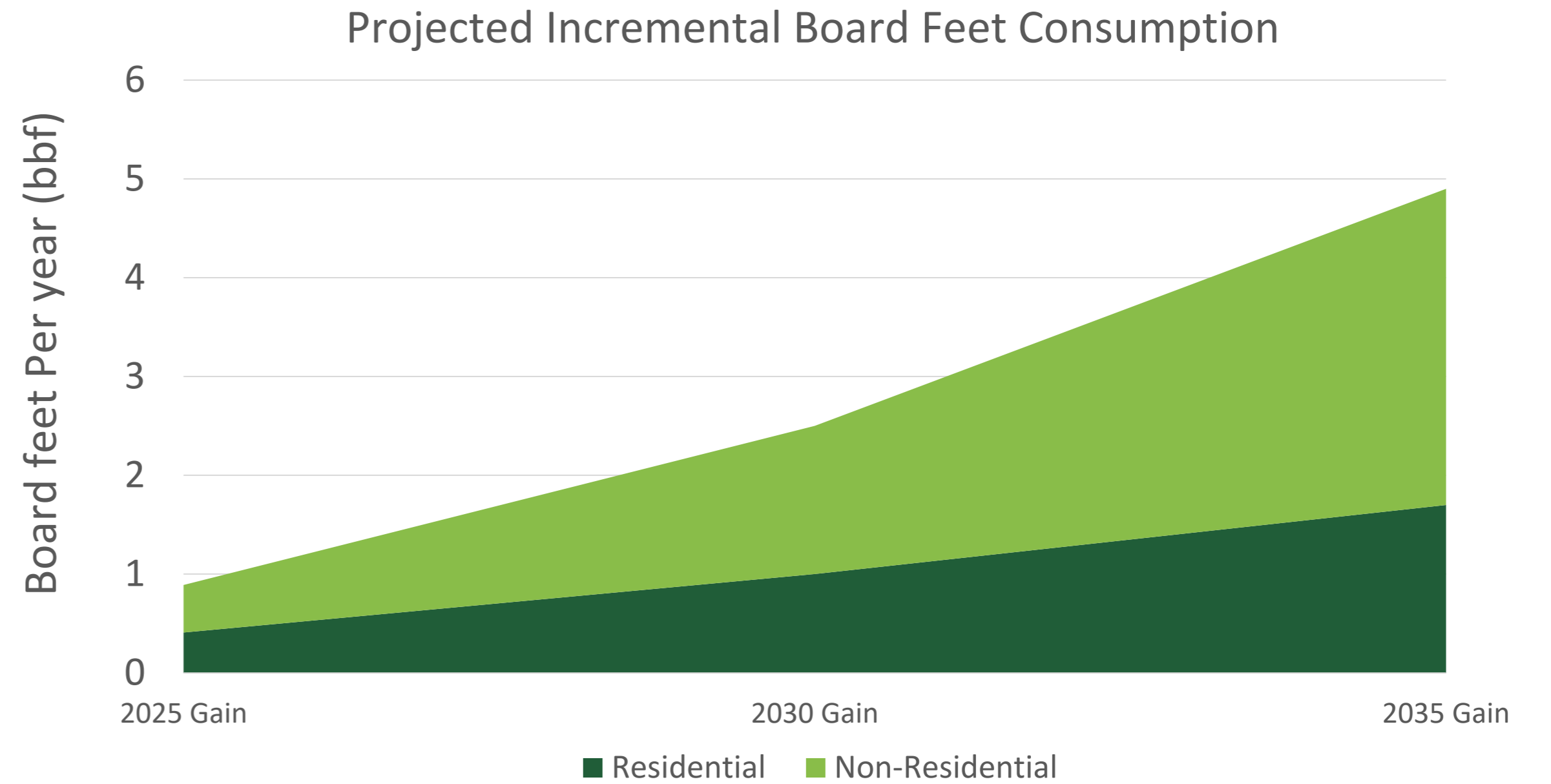
Incremental opportunity: +4.9 BBF

Market Characteristics

65% is in non-residential construction

78% is 1-6 stories (residential + non-residential construction)

20% is wood cores (elevator shafts or structural cores)



BBF per year	2025 Gain	2030 Gain	2035 Gain
Total	0.89	2.5	4.9

Note: Outlook assumes 25% of buildings are built with low wood use factors, 50% with medium wood use factors, 10% with a high wood use factor, and 15% with a steel/wood wood use factor. Further descriptions of the wood use factors can be seen in the appendix.

Incremental Mass Timber (Glulam & Mass Panels) Consumption

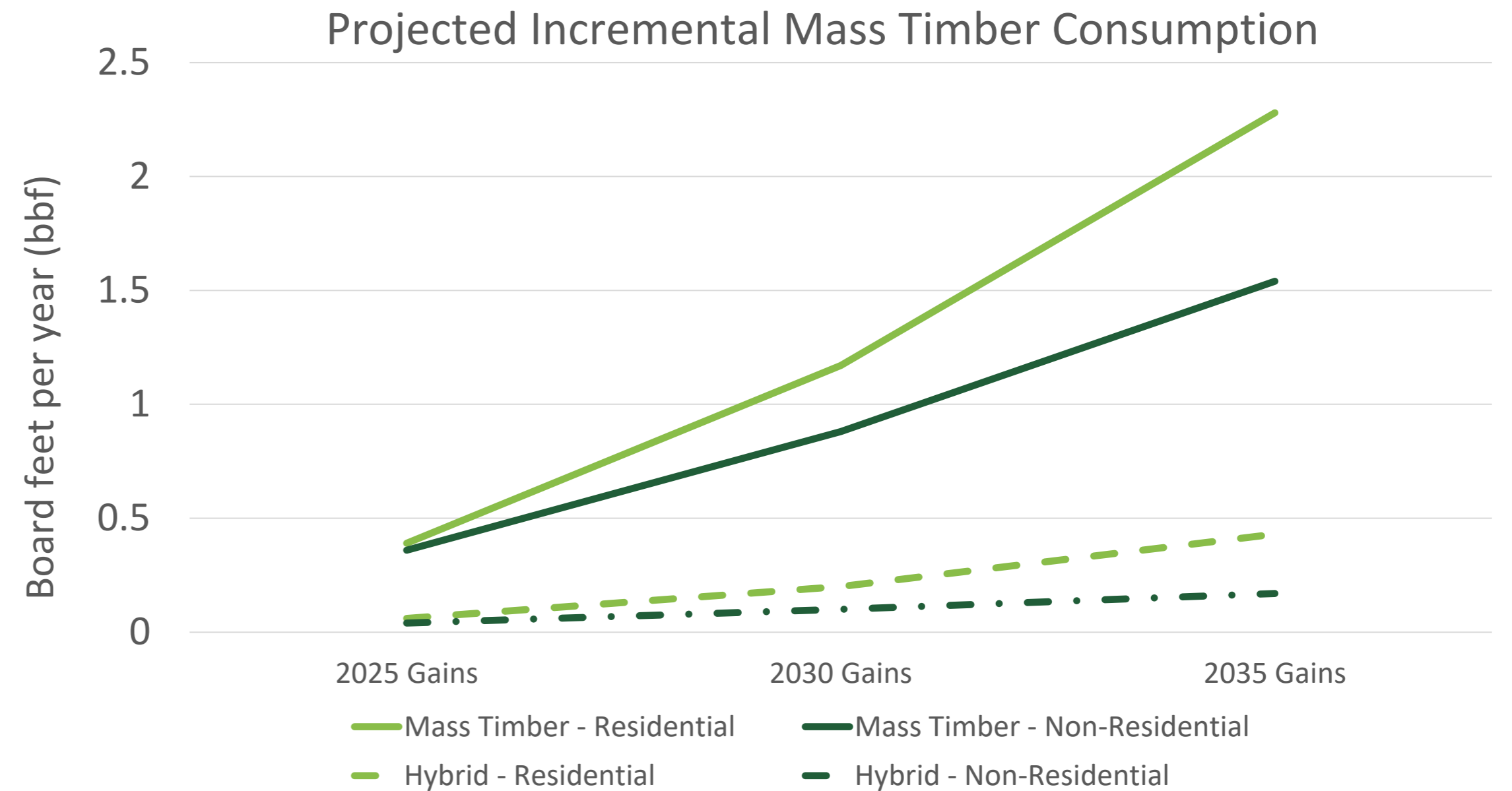
Summary

Incremental opportunity: +3.8 BBF

Market Characteristics

60% is in non-residential construction

72% is 1-6 stories (residential + non-residential construction)



BBF per year	2025 Gain	2030 Gain	2035 Gain
Mass Timber	0.7	1.8	3.2
Hybrid	0.1	0.3	0.6
Total	0.8	2.1	3.8

Note: Hybrid construction is defined as steel construction with mass timber floor plates. Outlook assumes 25% of buildings are built with low wood use factors, 50% with medium wood use factors, 10% with a high wood use factor, and 15% with a steel/wood wood use factor. Further descriptions of the wood use factors can be seen in the appendix.

Incremental Softwood Light-Frame Consumption

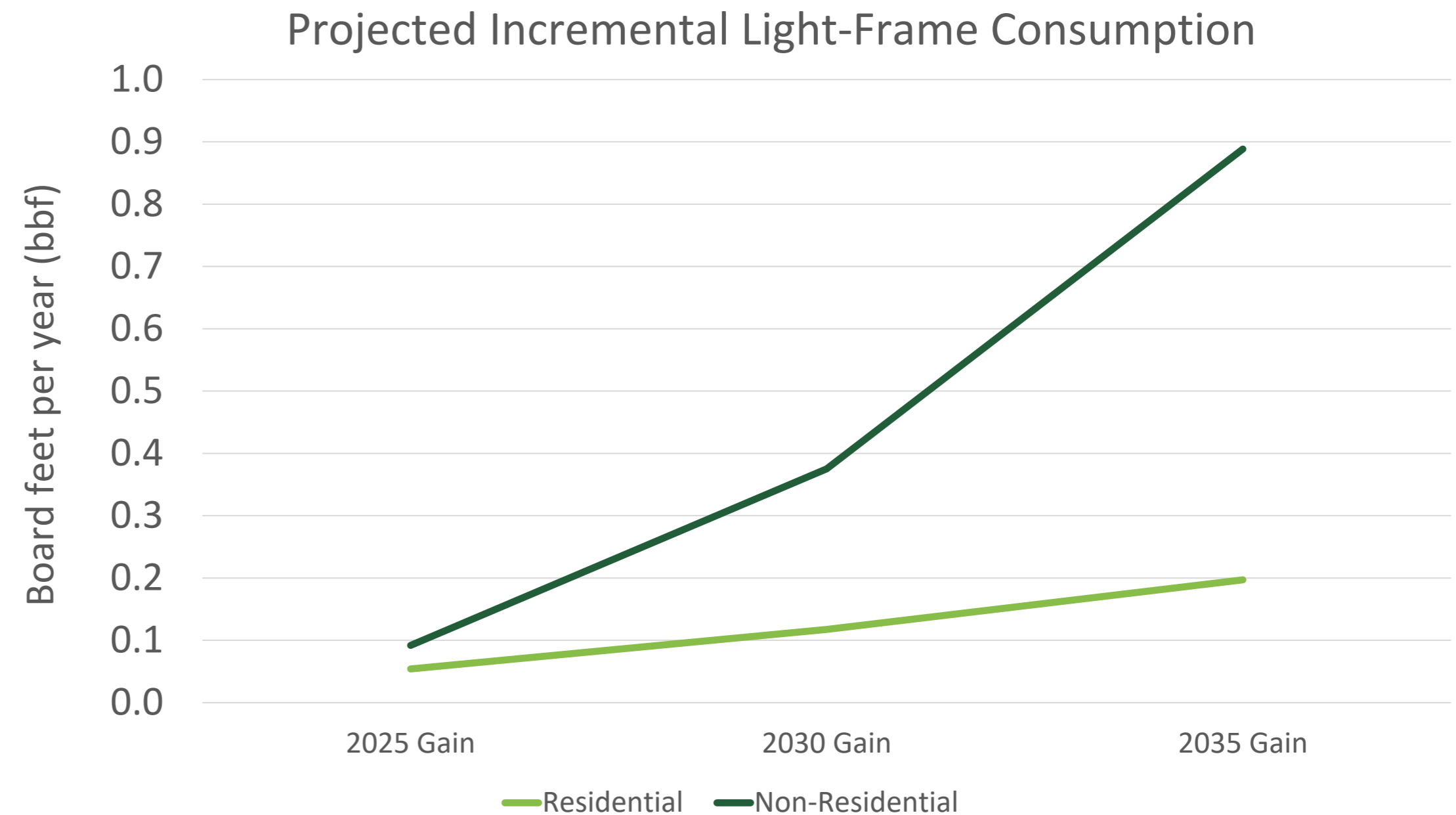
Summary

Incremental opportunity: +1.1 BBF

Market Characteristics

82% is in non-residential construction

100% is 1-6 stories (residential + non-residential construction)



BBF per year	2025 Gain	2030 Gain	2035 Gain
Total	0.2	0.5	1.1

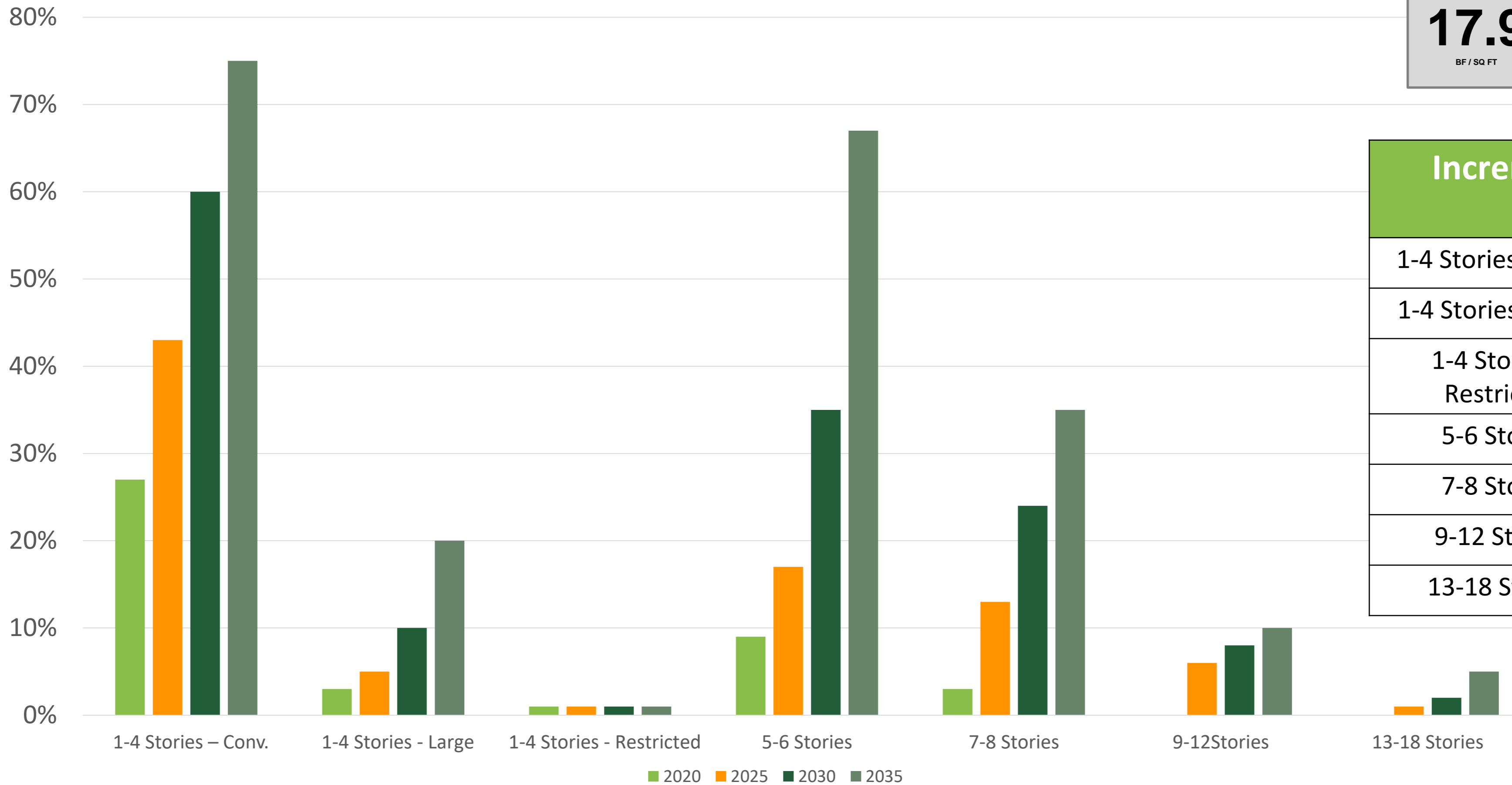
Note: Outlook assumes 25% of buildings are built with low wood use factors, 50% with medium wood use factors, 10% with a high wood use factor, and 15% with a steel/wood wood use factor. Further descriptions of the wood use factors can be seen in the appendix.

Market Shares – Non-Residential

Current Share and Target Shares in 2035



17.9
BF / SQ FT

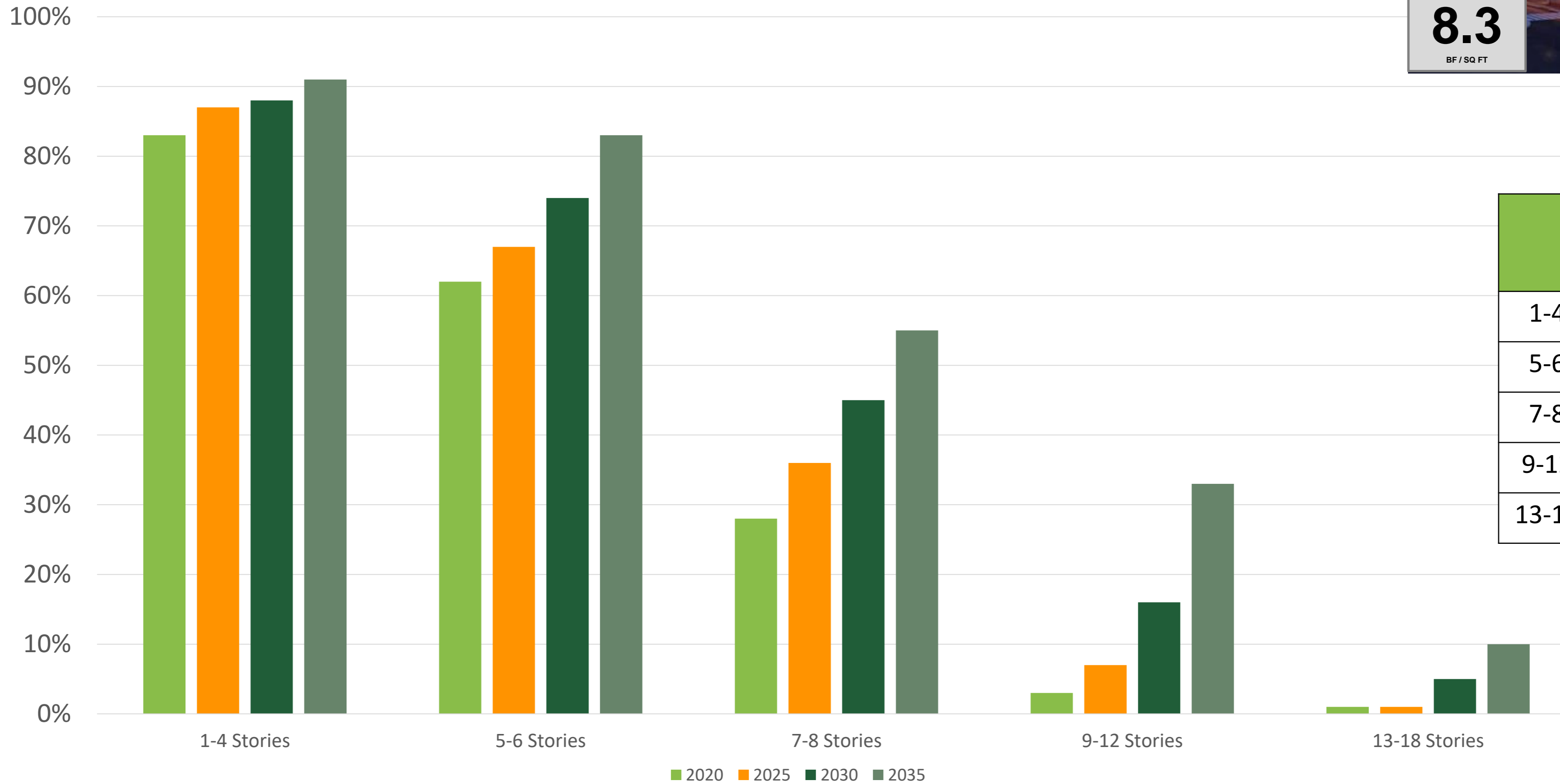


Incremental Market Share (2035-Current)	
1-4 Stories – Conv.	48%
1-4 Stories – Large	17%
1-4 Stories – Restricted	0%
5-6 Stories	58%
7-8 Stories	32%
9-12 Stories	10%
13-18 Stories	5%

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Market Shares – Residential

Current Share and Target Shares in 2035



Incremental (2035-Current)	
1-4 Stories	8%
5-6 Stories	21%
7-8 Stories	27%
9-12 Stories	30%
13-18 Stories	9%

Note: Outlook assumes 25% of buildings are built with low wood use factors, 50% with medium wood use factors, 10% with a high wood use factor, and 15% with a steel/wood wood use factor. Further descriptions of the wood use factors can be seen in the appendix. All wood use factors include core.

Projection of Softwood Lumber Consumption by Year

Projections to 2035

RESIDENTIAL INCREMENTAL
OPPORTUNITY

1.32-2.55 BBF

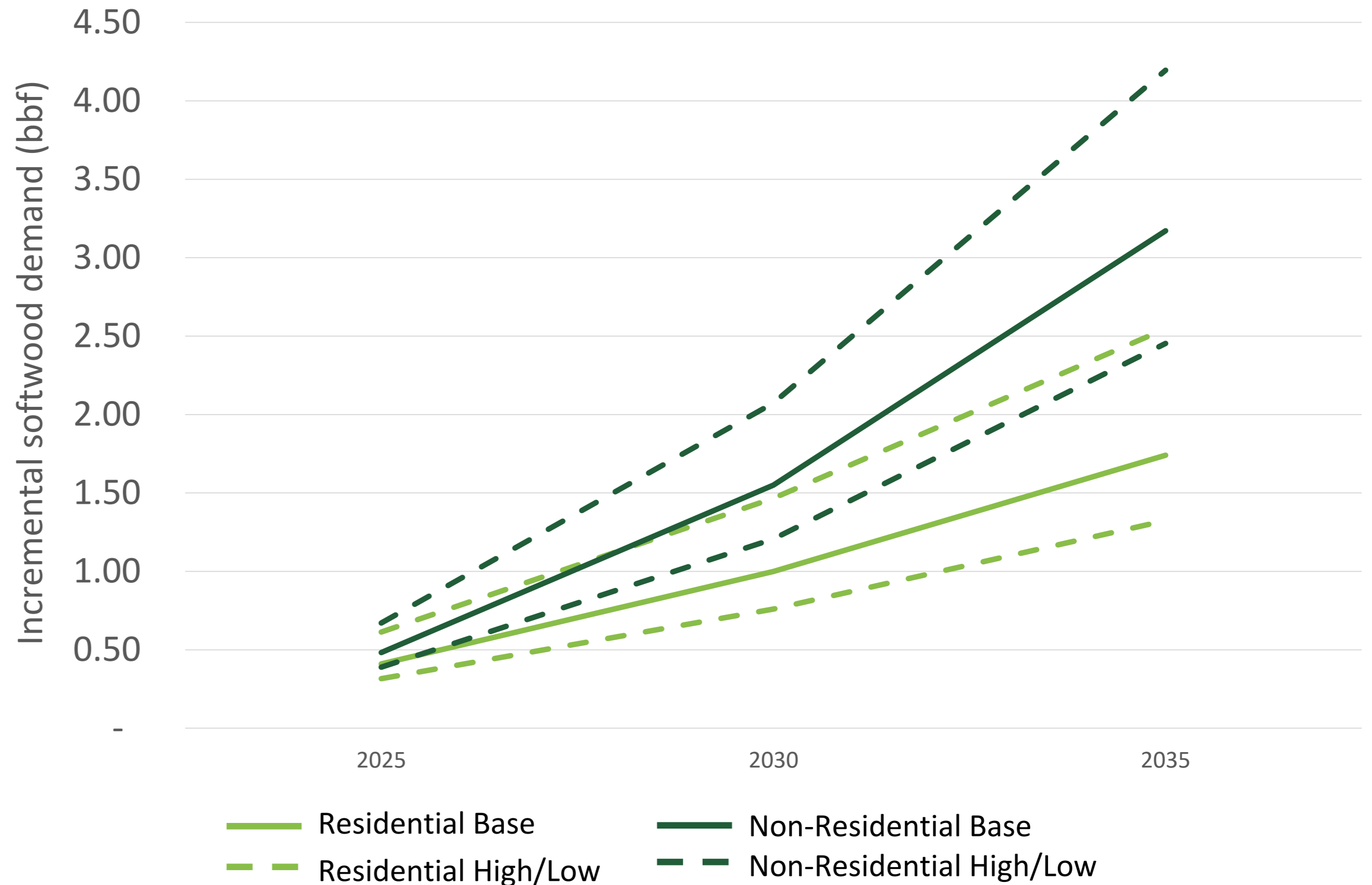
NON-RESIDENTIAL INCREMENTAL
OPPORTUNITY

2.45-4.20 BBF

TOTAL
INCREMENTAL ↑
OF **3.77-6.75** BBF

Opportunity accelerates after 2030
as target shares in non-residential
increase.

Projected Incremental Softwood Demand
(National)



Projection of Mass Timber Consumption by Year

Projections to 2035

RESIDENTIAL INCREMENTAL
OPPORTUNITY

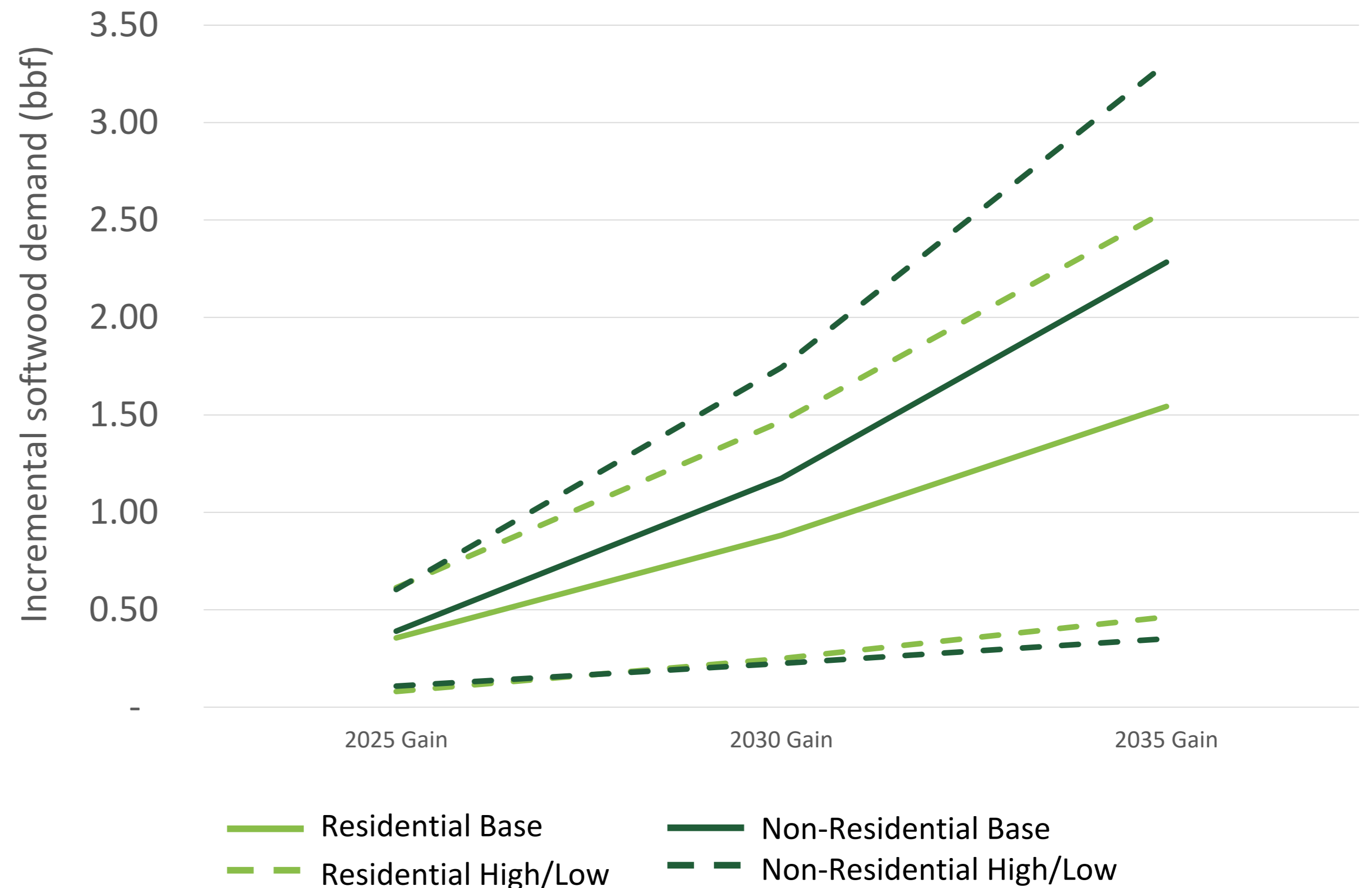
0.46-2.55BBF

NON-RESIDENTIAL INCREMENTAL
OPPORTUNITY

0.35-3.30BBF

TOTAL
INCREMENTAL ↑
OF **0.81-5.85**BBF

Projected Incremental Mass Timber Demand
(National)



Projection of Light-Frame Consumption by Year

Projections to 2035

**RESIDENTIAL INCREMENTAL
OPPORTUNITY**

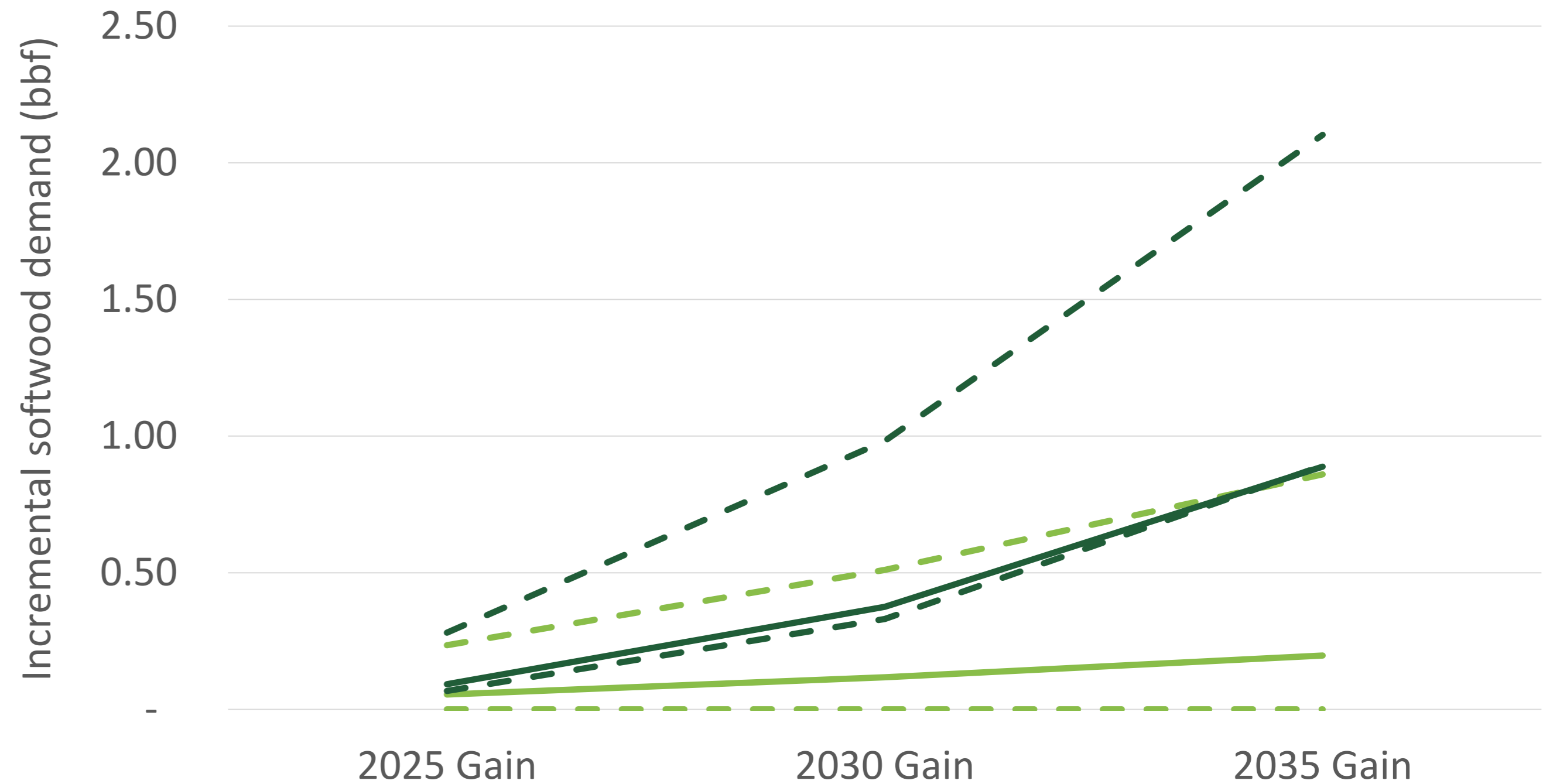
0.00-0.86BBF

**NON-RESIDENTIAL INCREMENTAL
OPPORTUNITY**

0.89-2.10BBF

**TOTAL
INCREMENTAL ↑
OF 0.89-2.96**BBF

Projected Incremental Light-Frame Demand
(National)



— Residential Base — Non-Residential Base
- - - Residential High/Low - - - Non-Residential High/Low

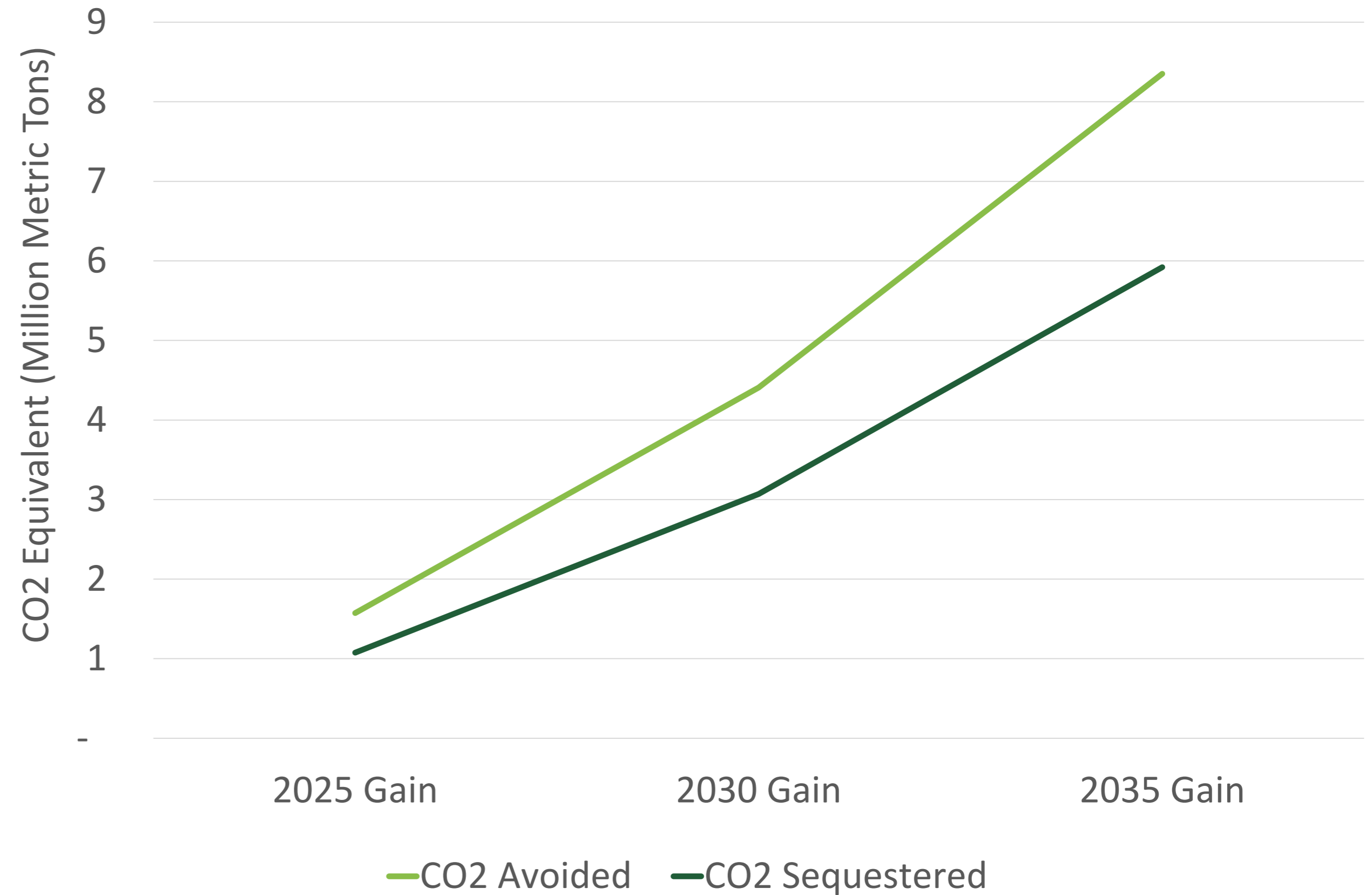
Projection of Carbon Impact by Year

Projections to 2035

**TOTAL
INCREMENTAL ↑
OF ~8.4 MILLION
TONS OF
CO₂ AVOIDED**

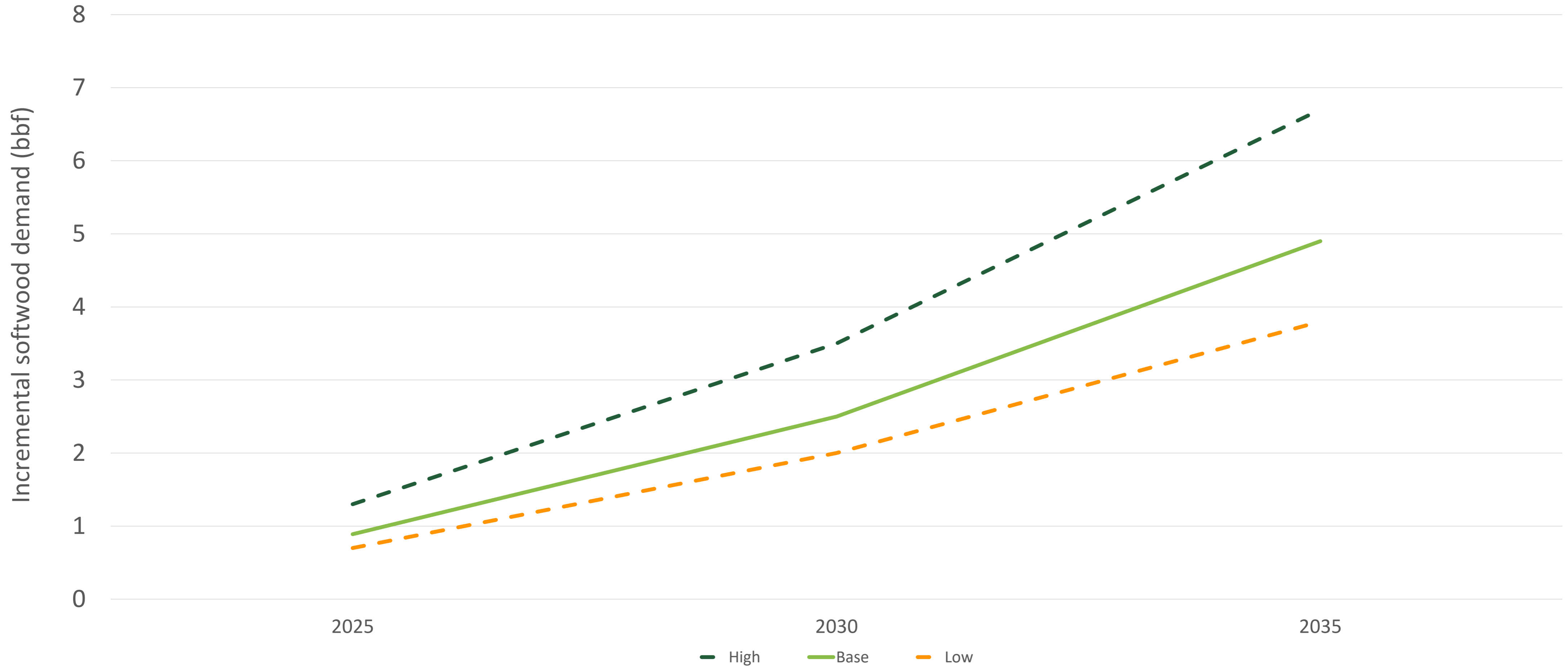
****MODELED OF BASE CASE****

Projected Incremental Carbon Impact
(National)



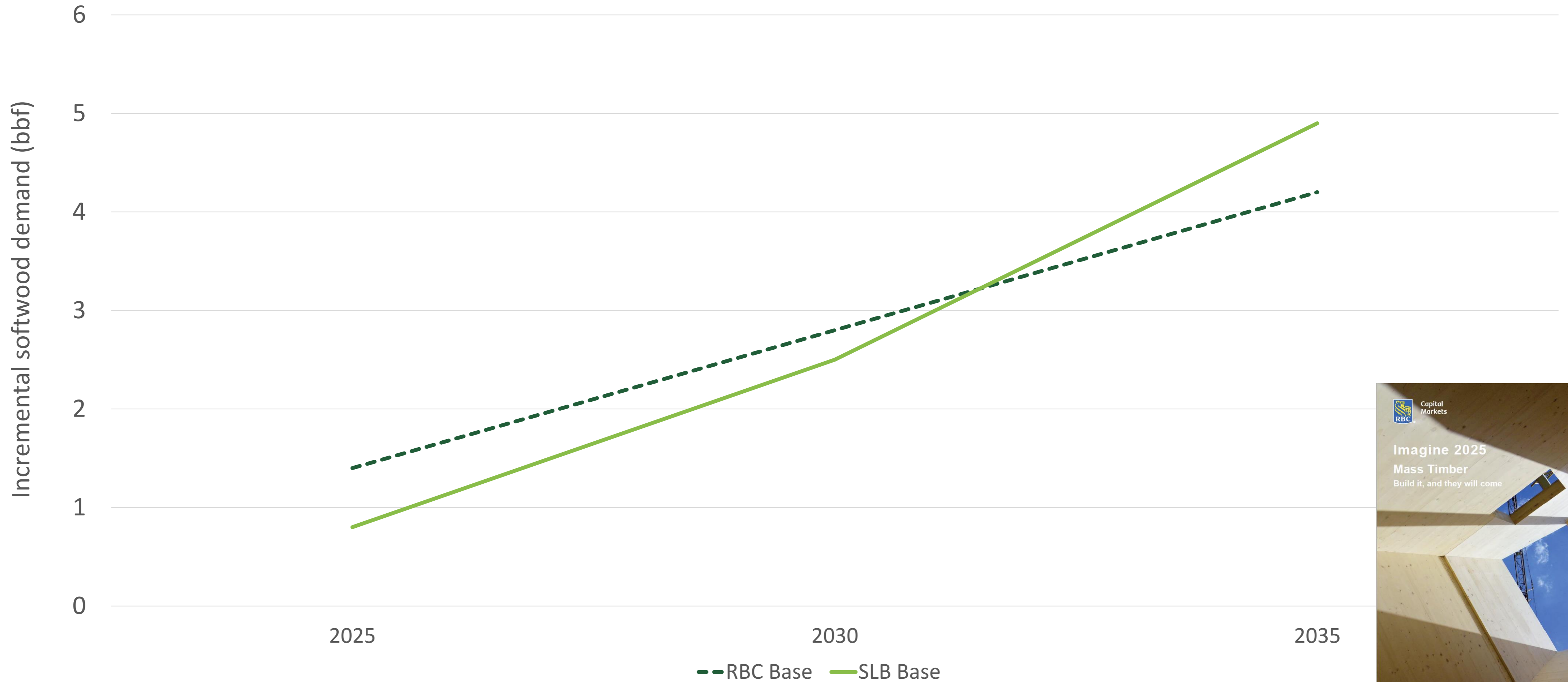
Mass Timber Outlook

U.S. – Incremental Lumber Demand



Mass Timber Outlook Comparison

U.S. – Incremental Lumber Demand



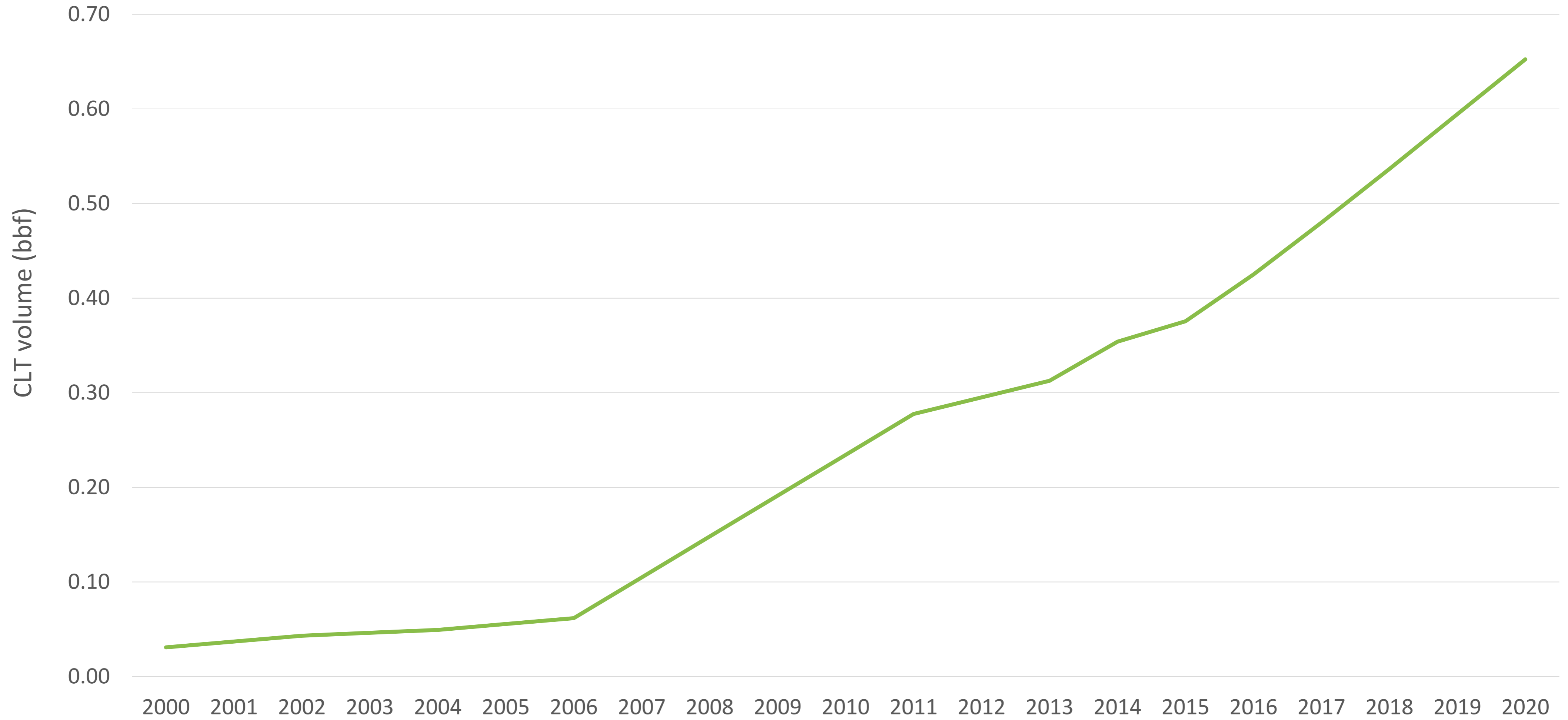
Sources:

RBC Capital Markets, *Imagine 2020 Mass Timber Report*, 9/20

SLB *Mass Timber Outlook, 2020 FP Innovations*, 10/20

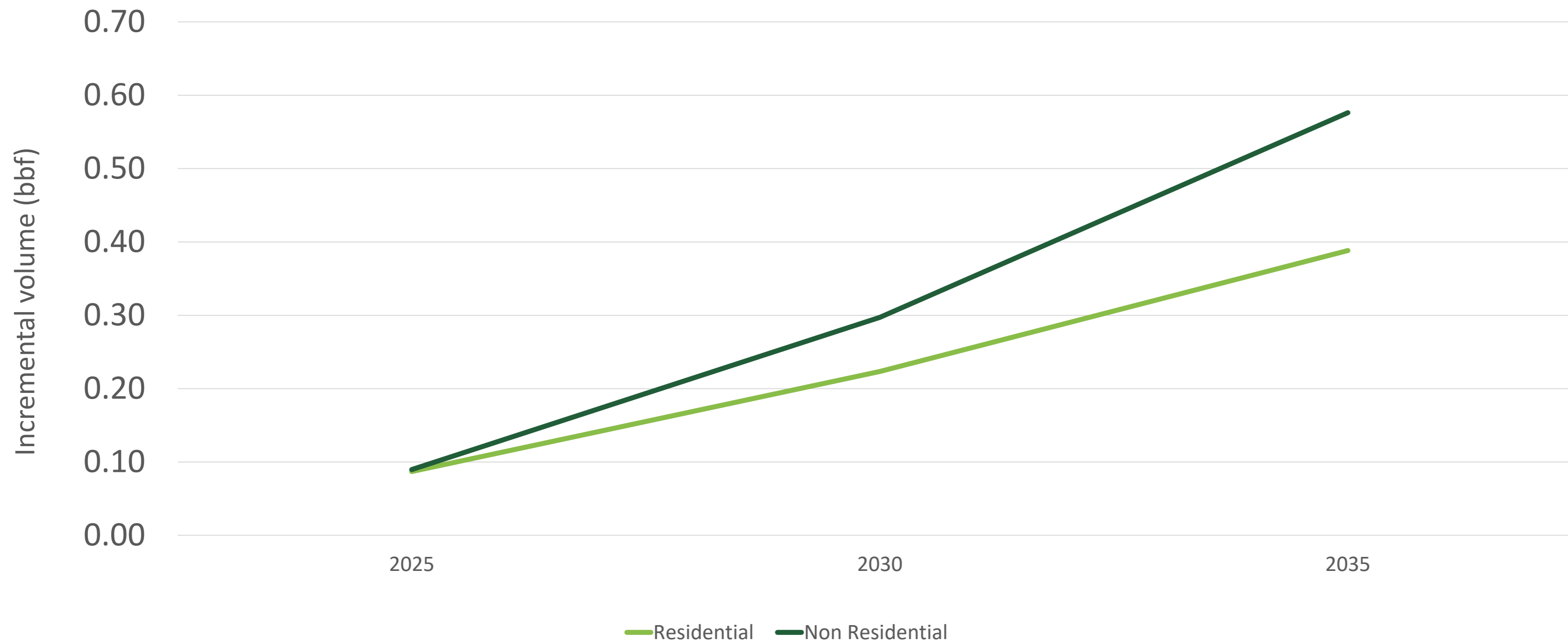


Europe CLT Adoption Curve



Impact of Wood Cores

- **Wood cores** are either elevator shafts or structural cores (stairwells, etc).
- Base case assumes cores in **1-6 story buildings**, in **7-8 story buildings from 2025 onwards**, and in **9-12 story buildings from 2030 onwards**.
- **Opportunity = 1 BBF by 2035.**



2035 Percentage Change

Residential

35%

Non-Residential

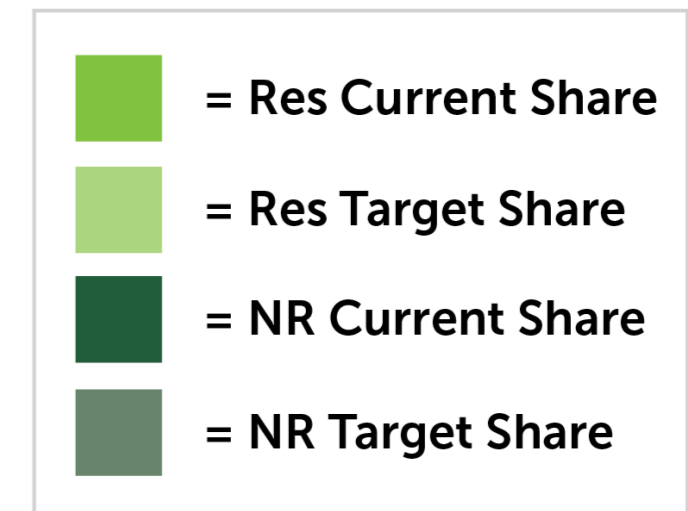
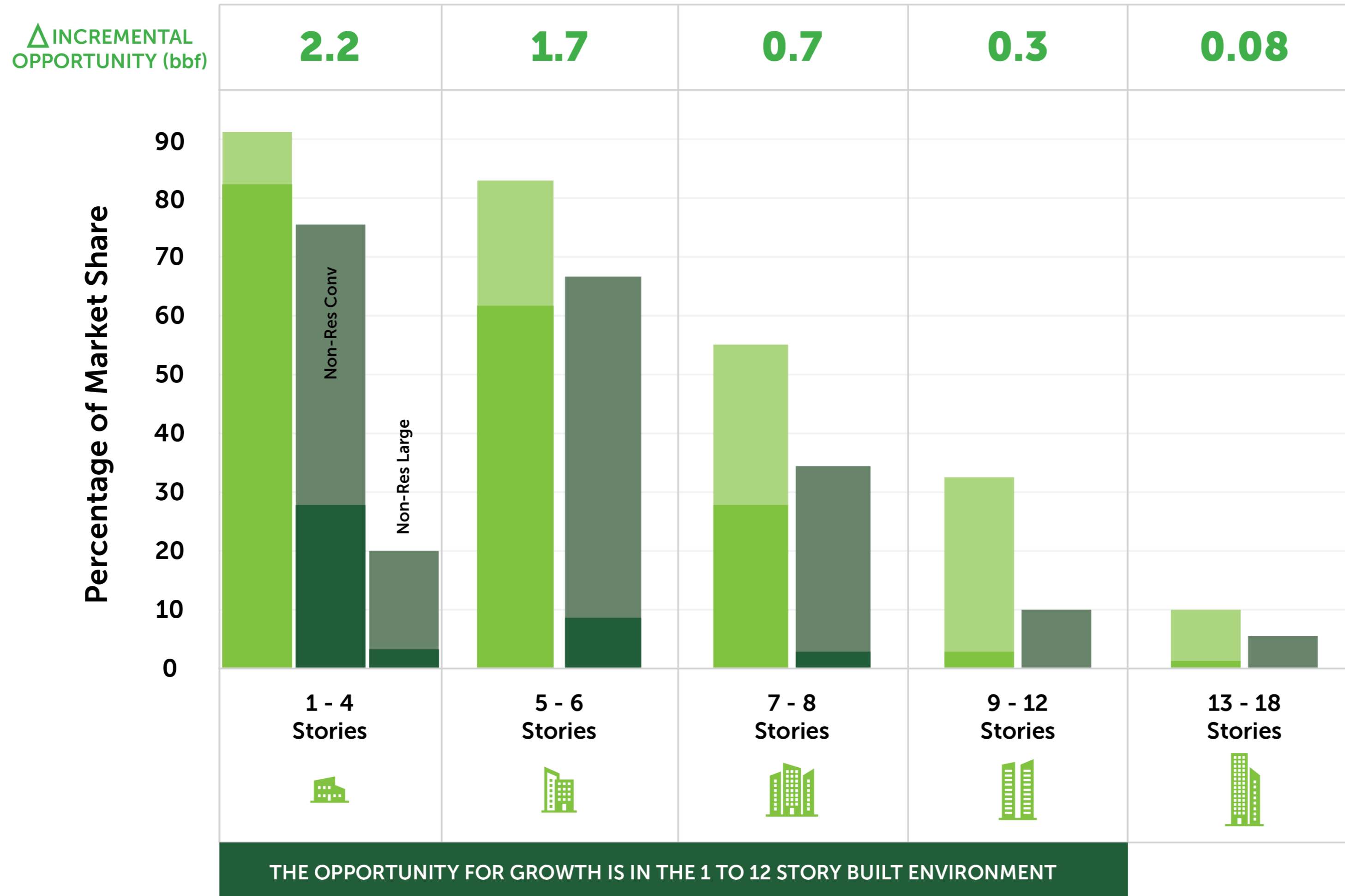
65%

% Volume
Related to Core

20%

Incremental Softwood Lumber Demand

U.S. – Incremental Demand at Target Market Shares in 2035



RESIDENTIAL INCREMENTAL OPPORTUNITY
1.32-2.55 BBF

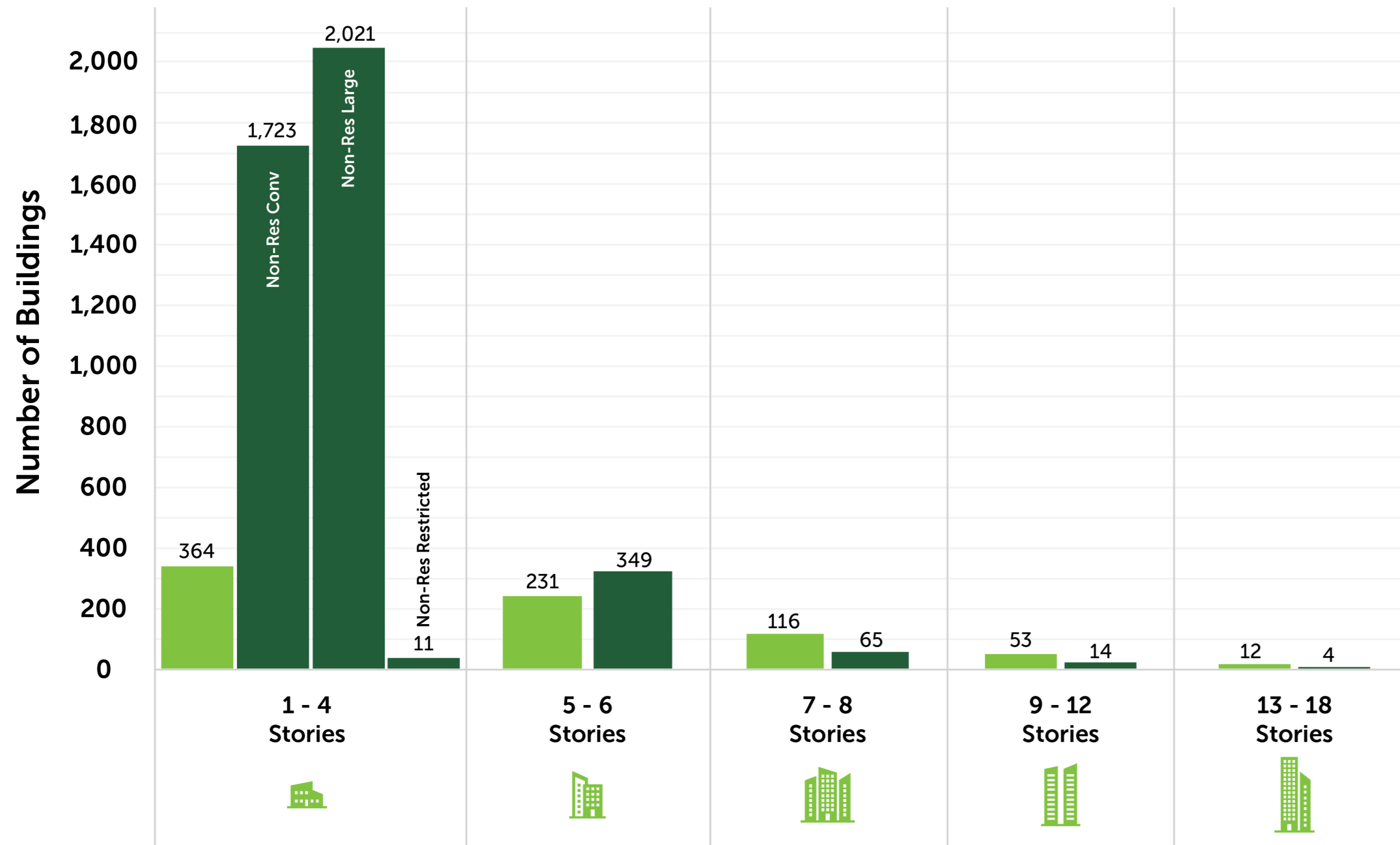
NON-RESIDENTIAL INCREMENTAL OPPORTUNITY
2.45-4.20 BBF

TOTAL INCREMENTAL ↑
OF **3.77-6.75** BBF



Source: 2020 FPIinnovations

Estimated Incremental Number of Buildings

U.S. – Incremental Demand at Target Market Shares in 2035



THE OPPORTUNITY FOR GROWTH IS IN THE 1 TO 12 STORY BUILT ENVIRONMENT

 = Res Buildings
 = NR Buildings

 **1-4 STORIES**
4,119 BUILDINGS

 **5-6 STORIES**
579 BUILDINGS

 **7-8 STORIES**
181 BUILDINGS

 **9-12 STORIES**
67 BUILDINGS

 **13-18 STORIES**
16 BUILDINGS

TOTAL INCREMENTAL BUILDINGS 4,962

MARKET CHARACTERISTICS

84%

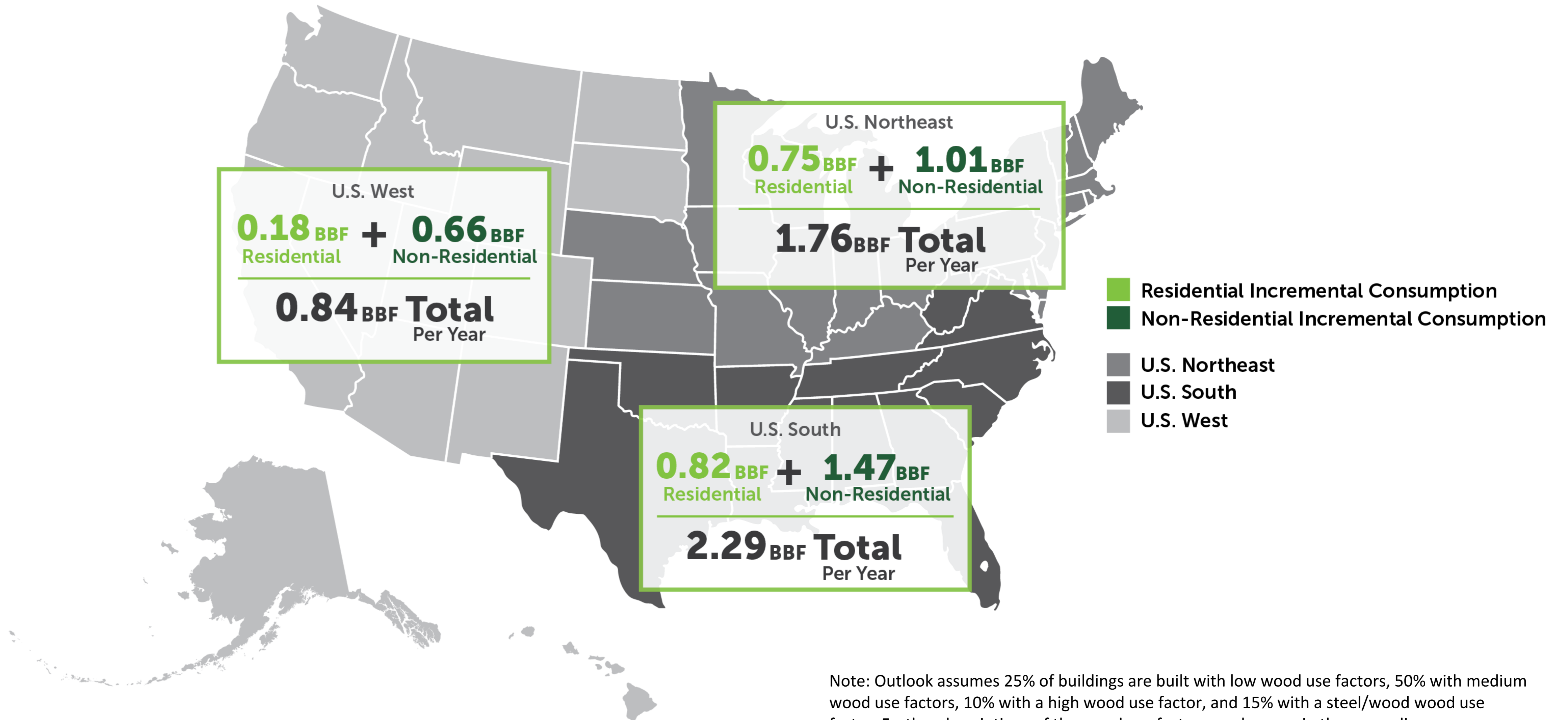
is in non-residential construction

95%

is 1-6 stories (residential + non-residential construction)

Incremental Softwood Lumber Consumption

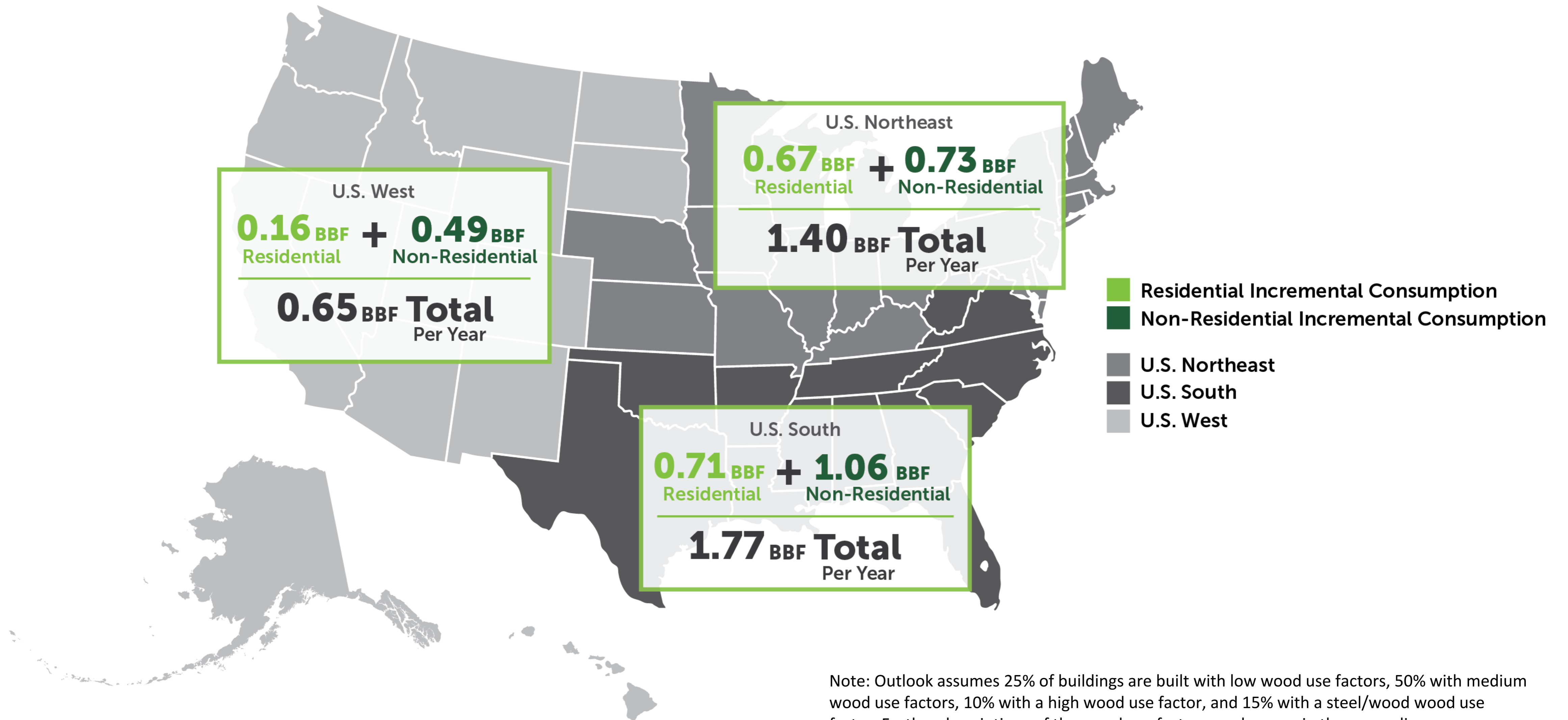
U.S. – Incremental Demand at Target Market Shares in 2035



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Incremental Mass Timber

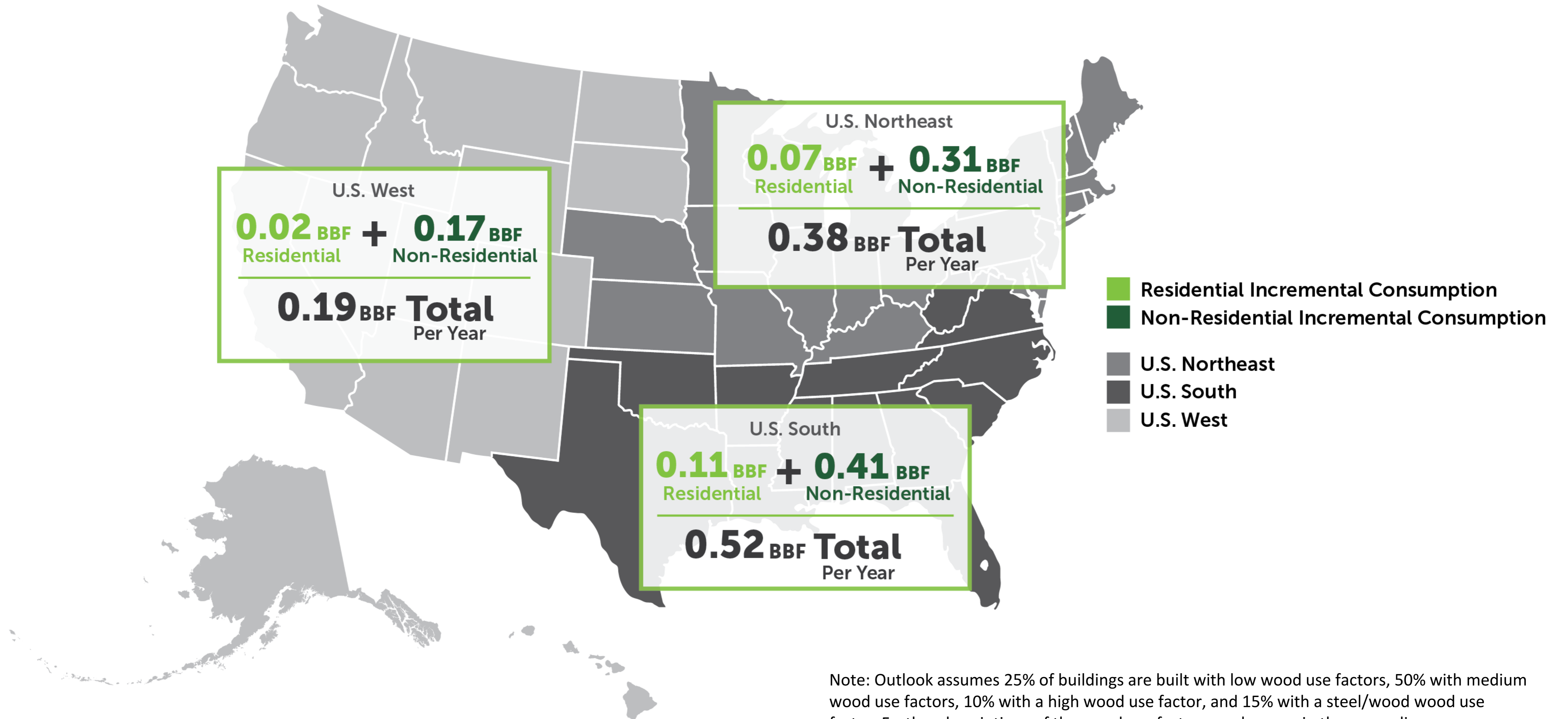
Region Summary – Base Case



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Incremental Light-Frame

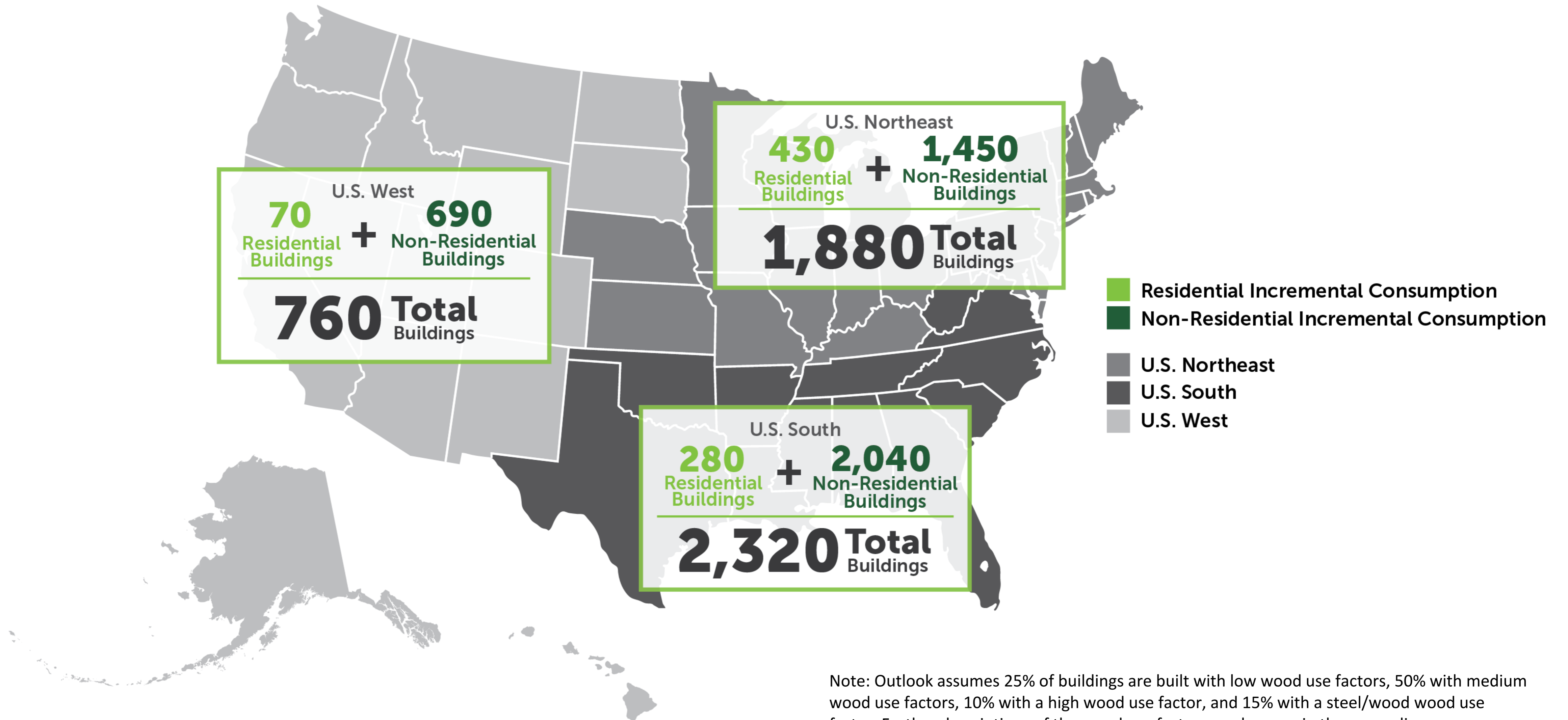
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Estimated Incremental Number of Buildings

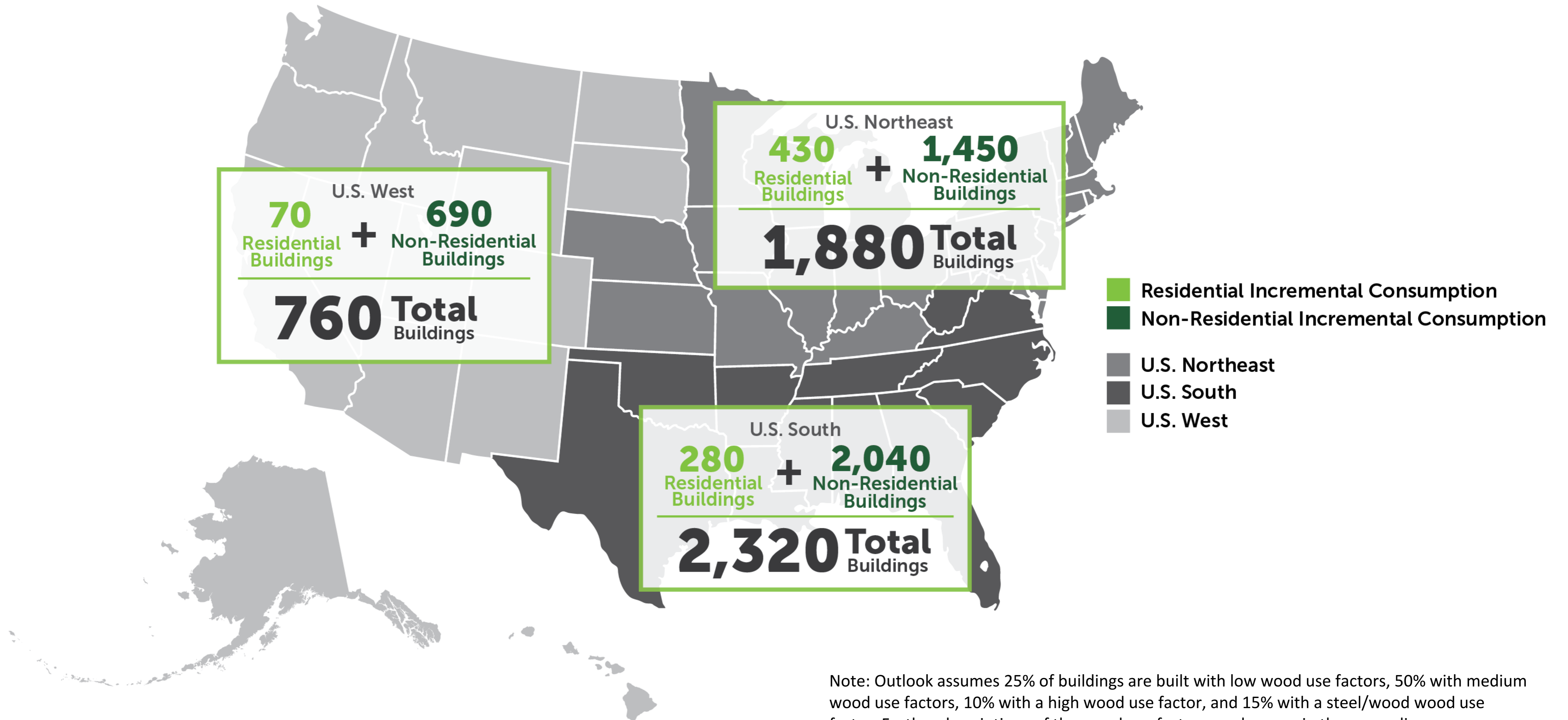
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**If you have any questions,
please contact the
Softwood Lumber Board at
info@softwoodlumberboard.org.**

